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December 28, 1957

INDEX

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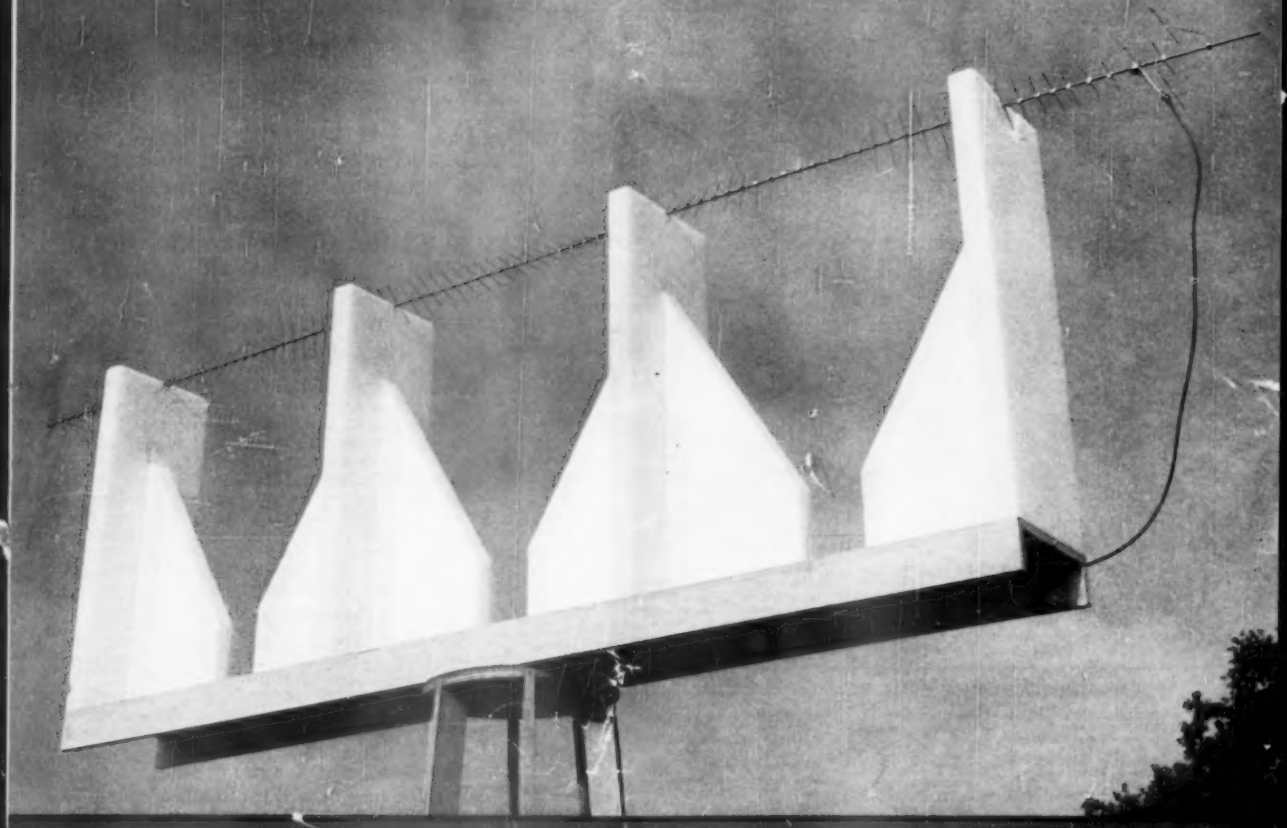
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Twist for Antennas

See Page 405

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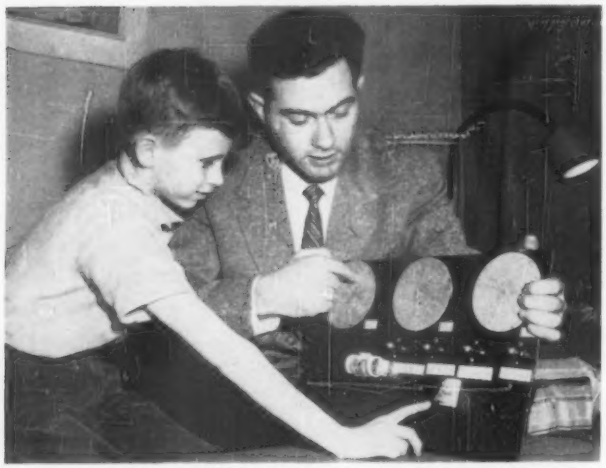

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PHYSICS

Atom Smasher Obsolete

Competition in the race for bigger and better atom smashers has resulted in a controversy over the Atomic Energy Commission's projected 12.5 Bev proton synchrotron.

➤ THE ATOMIC Energy Commission's biggest atom smasher, a 12.5 billion electron volt proton synchrotron to be built at Argonne National Laboratory near Chicago, will be obsolete before it is finished in 1962.

This is the considered opinion of many of the country's top experts in high-energy nuclear physics. They think the AEC is making a mistake to build such a machine at this time.

The decision to do so was made at the very highest level within the AEC. Back of the go-ahead signal is a long history of disagreement between two scientific groups, the scientists at Argonne and those of MURA, or Midwestern Universities Research Association organized by 15 Midwestern universities to promote research on high-energy accelerators.

The MURA scientists are working on the third model of a radically new kind of atom smasher, capable of producing effective energies of hundreds of billions of electron volts, far in excess of any other machines now planned. They are using computers extensively to help them determine the feasibility of this idea, and their work is supported by both the AEC and the National Science Foundation.

The idea behind the super atom smasher is to hurl two atomic beams at each other, instead of the single beam crashing into a stationary target as in present machines. Suggested name for such a machine is "synchroclash," also known as the intersecting beam accelerator.

Scientists build atom smashers with higher and higher energies to create and study new nuclear particles, as well as to examine in greater detail the reactions of those already known. Man-made machines are now beginning to duplicate the lowest part of the cosmic rays' energy range.

Russia, with a 10,000,000 electron volt machine, now leads the world in producing the highest energy particles. Some scientists charge that the main reason for deciding to build the 12.5 Bev machine at Argonne was to outdo the U.S.S.R. Since only $1,500,000 of the estimated $27,000,000 the new U.S. accelerator will cost has been made available for initial design work, they believe the AEC should admit its mistake and not build it. By the time the machine is finished, two other, considerably more powerful atom smashers will be in operation. One is the alternating gradient synchrotron, under construction at AEC's Brookhaven National Laboratory, Upton, Long Island, N. Y., and the other a similar machine being built in Geneva by the European Organization for Nuclear Research, or CERN.

Both these accelerators, which will be about one-half mile in circumference, will have energies in the 25 to 30 billion electron volt range.

The Russians have revealed plans for building an accelerator to reach 50 billion electron volts, or Bev, also on the same principle, but it is not known whether or not construction has started.

Also in dispute is the location of the proposed MURA accelerator, if and when it is approved. The MURA scientists want to construct it near the University of Wisconsin, but the AEC contends this would cause needless duplication of facilities already available at Argonne.

MURA members are the Universities of Chicago, Illinois, Indiana, Iowa State College, State University of Iowa, Kansas, Michigan State, Michigan, Minnesota, Northwestern, Notre Dame, Ohio State, Purdue, Washington University at St. Louis, and Wisconsin. Dr. H. R. Crane, physics professor at the University of Michigan, is president of MURA.

Science News Letter, December 28, 1957

MANPOWER

Research Brains Scarce

➤ BRAINS have now become more scarce than money in the field of medical research, a nationwide survey of leading researchers, sponsored by Merck & Co., has shown.

The survey also revealed, not surprisingly, that the great need now is for basic research. Most of the scientists held the public partly responsible for the present situation because the public approves the spending of millions of dollars to "cure cancer" but becomes disinterested about money to study cell physiology, which may or may not lead to a cure for anything.

"There's no distinction in the public's mind, between pumping a well handle and looking for a new well," one scientist said.

Other important factors brought out were that the abundance of new research funds was drawing topnotch people away from teaching. Medical schools occasionally turn down grants because it costs too much to accept them. Researchers have to be trained, and space, services and overhead have to be supplied.

The main need now is for men, not money, many of the scientists agreed. Low pay is the most critical factor affecting the shortage. Many of the researchers could make much more money in other fields of medicine. Those interviewed felt there is a financial burden placed on competent people who decide to enter or to stay in the research field.

The hardest men to find, apparently, are the creators. There are too few men in the world who have full backgrounds in several sciences and can come up with so-called cockeyed ideas, rather than orthodox ideas.

"Orthodox ideas lead to nothing," one researcher replied to the survey.

Science News Letter, December 28, 1957

ATLAS GOES UP—The U. S. Air Force successfully launched its Atlas missile at Cape Canaveral, Fla., on Dec. 17. It reportedly attained an altitude of 80 miles and covered a distance of more than 600 miles.

TECHNOLOGY

Twisted Antenna Means Increased Signal Power

See Front Cover

➤ A TWIST in antenna design has enabled engineers to increase the capacity of the parallel-rod antenna for amplifying radio and television signals.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows a precise ten-foot long model of a full size antenna. By twisting the parallel rods about its supporting axis the antenna's length and power "gain" are increased.

Dr. D. K. Reynolds of Seattle University's electrical engineering department developed the technique in collaboration with the Stanford Research Institute, Calif.

Science News Letter, December 28, 1957

GENERAL SCIENCE

U. S. Science Not Lagging

A physicist recently returned from Russia believes reports of Soviet advances in basic research are exaggerated as are reports of their scientists' high social and economic status.

➤ THE RUSSIANS are not ahead of the United States in basic research.

A majority of Russian scientists are poorer paid than their American counterparts and tales of their pampered life have been exaggerated.

Actual discoveries by Russia's nuclear physicists in basic science are not impressive.

These are some of the conclusions drawn by Dr. Donald J. Hughes, a senior physicist at Brookhaven National Laboratory, Upton, N. Y., after a recent month's tour of Polish and Russian nuclear laboratories as a guest of the Soviet Academy of Sciences.

Dr. Hughes' findings may appear surprising to most who have been reading other reports on Russian science of late. His "minority" report is in direct contradiction to these. He is optimistic about the future and even points out that because of the different ideologies in the U. S. and the U.S.S.R. "there is little danger that the Soviets will pass us up in basic science."

In Poland, Dr. Hughes found the Polish nuclear scientists looking for the West's help in science; anxious to receive Western research equipment; and having a high opinion of Western science as the world leader in fundamental research. He also found anti-Russian feelings widespread from the "man-in-the-street to the intelligentsia."

In Russia, Dr. Hughes found the only Red scientists to be socially pampered were the relatively few Academicians. The greater majority of scientists, he says, receive about half the pay of American scientists in real purchasing power and do only half as well in their standard of living as our scientists.

Although the Russians excel largely in the field of large equipment, they are definitely lagging far behind the United States in many areas of basic research.

Speaking of the world's largest accelerator, which the Reds have at Dubna near Moscow, the Soviet atomic power plant and the sputnik, Dr. Hughes has this to say:

"In each of these cases the Soviet high command has picked the particular development and has pushed it ahead without regard for cost or manpower. These developments, however, are not basic science and are the type of things that can be pushed to rapid success if funds are not limited."

He cautions the U. S. from adopting the same practice. The Academy of Sciences, he says, rules all science, engineering and technology in the Soviet Union with an iron hand. Dr. Hughes explains, too, that Red scientists are friendlier to the West than the Academy.

Dr. Hughes says that under the present Russian set-up it is hard to see how basic science can advance. There is some evidence of change taking place, he notes, concluding, however, that:

"But my own opinion is that the difficulties go so deeply into the fundamental structure of the Soviet society that it would be impossible to gain the freedom of research so necessary to progress without a change in the Soviet Government more deep-seated than we can anticipate for decades."

Dr. Hughes' full report on his trip appears in *Physics Today* (Dec.).

Science News Letter, December 28, 1957

GEOPHYSICS

Antarctic Leader Receives Top Award

➤ THE MAN who has lived in Antarctica longer than any other person has received the Army's top civilian award.

Dr. Paul A. Siple of Arlington, Va., former scientific leader at the U. S. South Pole station in Antarctica, was given the Army's Exceptional Civilian Service Award by Secretary of the Army Wilber M. Brucker.

Dr. Siple received the high honor for his "exceptional performance of duty" as deputy officer-in-charge of the U. S. Antarctic program, under the late Rear Admiral Richard E. Byrd, USN, and for his extraordinary service as scientific leader at the South Pole station.

As a result of Operation Deep Freeze studies, Dr. Siple reported that the cause of the cold swift winds on the Adelie Coast is their passage down a great sloping trough of ice 200 to 300 miles wide lying between the mountain range that begins near Little America and extends toward the Coast, and one of the two huge mounds of ice that make up the bulk of the Antarctica area.

The man who has lived more than four years on the "white continent" has just returned from his sixth trip to Antarctica. His first was made as a representative of the Boy Scouts of America on Admiral Byrd's first expedition in 1928-1930.

The American Polar Society recently made Dr. Siple an honorary member.

Science News Letter, December 28, 1957

PLANT PHYSIOLOGY

Develop Tomato Plant For Hot Climates

➤ A TOMATO plant that thrives when the night temperatures are high has been developed at California Institute of Technology's Earhart Plant Laboratory, Pasadena.

Within a few years, says Dr. Frits Went, director of the Laboratory, tomatoes of excellent processing quality may be grown commercially as far south as Texas. Now the tomato seems to be partial to life in California and in a narrow area running from the Midwest eastward to New Jersey. This is where night temperatures stay within the not-too-hot and not-too-cold range, about 64 degrees Fahrenheit, that has been critical to the tomato's flowering and fruit setting.

The strain is the result of selective breeding. A Philippine and an American variety were crossed and the resultant hybrid plants were inbred until scientists had a tomato plant that produced excellent fruit at night temperatures as high as 80 degrees Fahrenheit. The genes controlling temperature tolerance and fruit size are independently inherited, it was discovered.

Dr. Lester W. Schaible, a plant breeder for Campbell Soup Company which financed the program, directed the research.

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TECHNOLOGY

Ships Going Atomic

Submarines, tankers, merchant ships, whalers and ice-breakers are being powered by atomic energy as nations throughout the world become interested in nuclear ships.

➤ WHEN THE Russians launched their ice-breaker Lenin on Dec. 5, the world had its first atomic-powered surface vessel. It will not be the first atomic-driven sea-going craft, however, and most certainly, it will not be the last.

At present, the United States is going down to the sea in atomic ships faster than any other nation. With a brilliant record already chalked up by the world's first A-submarine, the Nautilus, the U. S. Navy has at least 13 more nuclear-powered submarines built, being built or planned.

In addition, the keel for the nation's first atomic-powered merchant ship, the N. S. Savannah, will be laid next spring. It will be powered by a pressurized water-cooled reactor, and is expected to enter service in early 1960.

To this can be added the nation's first atomic aircraft carrier and cruiser. The nuclear-powered carrier, scheduled for 1961, will be a forerunner of six such carriers expected to be commissioned by 1966. It will be powered by eight nuclear reactors and its cruising range will equal "many" non-stop trips around the world without refueling.

The atomic cruiser has already had its keel laid. Its completion, like that of the carrier, is set for 1961. When built, the U.S.S. Long Beach will not only be an A-powered ship, but will be capable of firing atomic missiles.

An atom-powered destroyer, called a frigate, is also planned.

The Russian ship is powered by a boiling water reactor. Displacing 16,000 tons, the Russians have reported their ice-breaker will be able to touch both the North Polar region and the South Polar region without refueling. Its speed in open water will be 18 knots. In addition to the atomic ice-breaker, the Russians are also known to be building an atomic whaler.

Both these Russian vessels are thought by naval observers to be test craft for a proposed Red nuclear-powered warship of battleship size. The Russians are also reported to be building atomic-powered submarines.

In addition to the United States and Russia, other strongly maritime nations have shown more than drawing board interest in nuclear ships.

The British are planning to construct a large nuclear tanker and an atomic submarine modeled after the Nautilus.

Germany's four maritime provinces of Bremen, Hamburg, Schleswig-Holstein and Lower Saxony have pooled their assets to produce an atomic-powered ship.

Japan has announced plans to build a 16,000-ton atom-propelled submarine tanker capable of traveling along at 22 knots.

Norway and The Netherlands have worked out a research program at the Norwegian-Dutch Joint Establishment for Nuclear Energy near Oslo, with the chief aim of constructing a prototype atomic reactor for marine propulsion in the next two years.

In 1955, Rear Adm. H. G. Rickover, father of the first atomic submarine, predicted that within five to ten years all new major warships would be propelled by atomic power. The same may very well be true for merchant ships in the foreseeable future.

Science News Letter, December 28, 1957

READING MACHINE—Tom L. Dimond of Bell Telephone Laboratories points to the writing area on the experimental machine he invented to read handwritten numerals. He holds a metal stylus for writing the numbers which appear in the panel at the top.

TECHNOLOGY

Automatic Device Reads Numerals

➤ A DEVICE for reading handwritten numerals or identifying numerals as they are being written was demonstrated at the Eastern Joint Computer Conference meeting in Washington, D. C.

The equipment could be used to read handwritten letters with some modifications, Tom L. Dimond of Bell Telephone Laboratories' systems engineering department reported.

The machine, about the size of a portable typewriter, is expected to become a valuable addition to telephone offices and other offices where large quantities of numerals are written and identified. The numerals have to be written with a pencil containing conductive lead.

Since each long distance ticket contains 20 to 30 handwritten characters and approximately 2,000,000,000 of the tickets are processed each year, the device is expected to be valuable in preparing telephone bills.

The machine recognizes numbers as they are written with a metal stylus on a special writing surface, indicating the numeral by lighting up the correct digit on a numbered panel. The information could, however, be transferred directly to an accounting machine or computer.

The numbers have to be written around two dots, placed one above the other. Seven sensitive lines extending radially from these two dots identify the numeral written depending on which lines are crossed.

The technique can be extended to permit identification of handwritten letters, Mr. Dimond reported. To do so, a four-dot system with 12 radial lines is necessary. Identifying letters as they are written is somewhat simpler, since advantage can be taken of the order in which the radial lines are crossed. Then the two dot system is sufficient.

The device is operated from flashlight batteries and requires no outside power source. Its small size is made possible by use of transistors.

Science News Letter, December 28, 1957

SCIENTIA INTERNATIONAL

NOVAS DEL MENSE IN INTERLINGUA

➤ **Resources de Energia.**—Carbon de basse qualitate pote esser gaseificate e le resultante gases pote esser transformate in combustibile liquide per le application de alte temperaturas. Un ressource economic de tal temperaturas es probabilemente a trovar in le calor de reactores nucleari.—Reporto al Instituto American de Ingenieros Chimic per Drs. R. C. Dalzell e J. P. McGee.

➤ **Recercas de Cancere.**—Al recente convention del Association American Medical a Philadelphia, cancerologos american e anglese participava in un discussion transatlantic per telephono. Le consenso del expertos esseva que le chimotherapia de cancere es pauco plus que un promissa futur. Un del angleses formulava que le interesse de agentes cancerotherapeutic nunc cognoscite es exclusivemente que illos contribue al clarification del processos morbide que occurre in casos de cancere.

➤ **Dentisteria.**—Dr. chir. dent. J. R. Cameron del Universitate Temple ha publicate un summario del grave morbos que dentistas ha frequentemente le opportunitate de recognoscer ante que le patiente ha ulle ration de consultar su medico general. Iste morbos include cancere buccal, anemia, tuberculose, e leucemia, proque in omne istos symptomas buccal precede non infrequentemente omne alteres. Secundo Dr. Cameron un dentista con un bon practica vide al minus un patiente per septimana a qui ille debe recommendar le un o le altere examine medical.

➤ **Technica Hospitalari.**—Al Hospital North Cambridgeshire in Anglaterra on ha installate "cossinos cantante" que provide le patientes con musica e permitte a illes parlar con le infirmera quando ista se trova foras del sala. Le cossinos es facite de cauchu spumose, e montate in illos es altoparlatores que ha essite appellate "cossinophonios."

➤ **Recercas de Cancere.**—Dr. med. vet. R. T. Pursell de Australia reporta frappante successos in le tractamento de certe tumores cancerose in micre animales per medio de blau methylenic. Le tumores assi attaccabile es exclusivemente typos a crescentia rapidissime. Dr. Pursell specula que blau methylenic disrumpe le metabolismo de certe cellulas cancerose. Ille opina que su discoperta signala un debilitate del cellula cancerose que debe esser investigate systematicamente.

➤ **Agronomia.**—Le principio del hybridisation, que ha producite le cognoscite frappantemente benefic effectos in le cultura de mais, pare haber devenite applicabile etiam al cultura de coton. Le difficultate, usque recentemente insuperabile, es que stamines e pistillos de plantas de coton se trova in le mesme individuo, con le resultato inevitabile de auto-pollination. Le precondition de hybridisation, i.e. de hetero-pollination, de coton es per consequente le occision del stamines per un methodo que lassa le pistillos intacte. Iste "gameticidio selective" esseva effectuate post multe essayos van per le application de solutiones de sales de chlorinate acidos organic circa un septimana ante le tempore del floration. Le experimentos in question esseva executate al Schola de Agricultura del Universitate California.

➤ **Agronomia.**—Per cambiar le tempore traditional del plantation de ris, multe paises del Oriente Extreme poterea reducer grandemente le enorme perditas in le messe de iste cereal que es currentemente causate per le typhones. Dr. Chia-min Hsieh del Universitate Catholic de America in Washington ha constatate que ris es specialmente vulnerabile al comenciamento e verso le fin de su crescentia. Proque 86 pro cento de omne typhones occurre inter julio e septembre (con 25 pro cento in septembre), il es possibile plantar ambe messes annual de ris de maniera que le plantas se trova in lor phase le plus resistente quando le typhones es le plus numerose.

➤ **Energia Solar.**—Fornos solar pro objectivos recercatori es producite in massa per le Corporation American de Projectores que utilisa in lor fabrication componentes de projectores militar que le armea statounitese vende a vil precio, viste que illos ha devenite obsolete in nostre era de aeroplanos ultrarapide. Fornos solar de un valor ver de 40 a 50 milles dollars pote assi esser vendite pro 8500 dollars.—Iste apparatos es quasi indispensabile in moderne recercas metallurgic proque illos produce altissime temperaturas sin le risco de contaminar le objecto calefacite.

➤ **Recercas de Cancere.**—Secundo un reporto ab le Statounitese Departimento de Agricultura, le facto que un composito chimic se monstra capace de inhibir le crescentia del ovarios de muscas domestic indica con alte grados de probabilitate que illo es etiam capace de inhibir le crescentia de cellulas cancerose. Iste discoperta va grandemente accelerar le selection de compositos chimic que merita esser essayate como possibile agentes cancerotherapeutic. Usque nunc mures e rattos esseva usate in iste genere de test preliminari, e mures e rattos es evidentemente plus difficile a elevar que muscas domestic.

➤ **Recercas de Cancere.**—Secundo Dr. V. Menkin del Universitate Temple a Philadelphia, cellulas lesionate per inflammation (o, forsan, per altere causas de destruction como per exemplo viruses o imbalancia hormonal) produce un factor de promotion de crecentia que es destinate a assister in le reparation del cellulas sed que, in le presentia de agentes cancerogene o de un predisposition congenite, pote resultar in le production de tumores. Dr. Menkin reporta le extraction de un "promotor de crescentia" ab inflammate cavitates pulmonar de canes. Su injection in le histos mammari de conilios resultava in un marcate excesso de crescentia que non eseseva clarmente cancerose sed que poteva esser considerate como al minus "precancerose."

➤ **Recercas de Cancere.**—Al Universitate Notre Dame, sex generationes de muses elevate in conditiones perfectemente amicrobial ha remanite completemente libere de cancere ben que illos representa un racia de alte susceptibilitate cancerogenic e durante que un gruppo de controlo a elevage non-amicrobial monstrava un incidentia de cancere de 98 pro cento al fin del dece-octave mense. Dr. J. A. Reynier, qui reportava le experimento, insiste que illo significa solmente que le causa de cancere in le muses experimental se trova in stato dormiente. Il es possibile que iste causa va redevenir efficace si le muses es subjicite a stresses o etiam como resultato de accidentes genetic.

➤ **Genetica.**—Le medios usate in le reglementation del natalitate in humanos va possibilemente esser inricchite per le addition de acido erucic que occurre in forte concentrationes in oleo de colza. In experimentos conducite al Universitate West-Ontario in Canada, acido erucic rendeva le masculos transientemente sterile. Illo non afficeva le femininas.

Science News Letter, December 28, 1957

GENERAL SCIENCE

Reading Interlingua

➤ YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you had never had contact with any foreign language.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Alexander Gode, SCIENCE SERVICE's Interlingua Division, 80 E. 11th St., New York 3, N. Y.

Science News Letter, December 28, 1957

MEDICINE

Bigger Link Between Weight, Heart Disease

➤ ALTHOUGH too much emphasis has been put on overweight as the direct cause of coronary heart disease, the indirect relationship between the two conditions is even greater than many studies have indicated, Dr. Richard S. Gubner, Equitable Life Assurance Society of the U. S., New York, N. Y., reported in *Nutrition Reviews* (Dec.).

Statistical studies that show little difference between overweight people and the so-called average weight ones as far as life span and heart disease go are misleading. There is quite a difference when overweight people are compared with those who are underweight, Dr. Gubner told SCIENCE SERVICE.

The "average" adult American is in fact moderately obese, with fat making up some 20% above the lean fat-free, body weight of the average middle aged male.

When moderately underweight individuals were compared with moderate overweights the death rate climbed steadily as the overweight increased, Dr. Gubner said.

Overweight is evidently related to disturbances in fat metabolism which may cause an increase in cholesterol level in the blood. But it still has to be proved that merely lowering the level of cholesterol in the blood will produce beneficial results.

At least in coronary thrombosis, cholesterol does not appear to be the dangerous agent but rather other fats in the blood which have a direct effect on blood clotting, Dr. Gubner said.

Science News Letter, December 28, 1957

ASTRONOMY

Constellations Shine

As the new year begins, astronomers prepare for the events to come, including two solar eclipses and one lunar, and the opportunity to study Mars as it approaches the earth.

By JAMES STOKLEY

➤ WITH THE BEGINNING of a new year, the winter constellations shine in the evening sky in their full glory. These are shown on the accompanying maps, which depict the sky as it appears about 10:00 p.m., your own kind of standard time, at the beginning of January, an hour earlier at the middle of the month and two hours earlier as the month comes to a close.

No planets are indicated as none are visible during these hours, although Venus may be seen earlier, in the first part of January.

Around Jan. 1, it sets more than two and one-half hours after the sun. Until then, Venus shines brilliantly in the southwest. However, it is rapidly drawing into line with the sun, and will be nearly in front of it on Jan. 28, in the position called inferior conjunction. By then, of course, it will be invisible, since it goes below the horizon as the sun does.

By the middle of February, as Venus swings to the west of the sun, it will be a morning star, shining low in the southeast just before sunrise.

Sirius, the dog-star, is the brightest star of the January evenings. This is in the southeast, as shown on the maps, in the constellation of Canis Major, the great dog. Above it, and to the right, is the magnificent constellation of Orion, the warrior, with the three stars in a row that mark his belt. Above the belt, to the left, is Betelgeuse, brightest star in this group, and below, to the right, shines Rigel.

Aldebaran: Bull's Eye

Still higher than Orion, and farther right, is Taurus, the bull, with the ruddy star Aldebaran that marks the animal's eye. High in the east, above and to the left of Betelgeuse, we find Gemini, the twins, with Pollux as the brightest star. Below this group, towards Canis Major, is Canis Minor, the lesser dog, with the star Procyon. Directly overhead, for the times that the maps are prepared, stands Auriga, the charioteer. In this is the bright star Capella, second only to Sirius among the stars now visible.

Looking toward the east, the constellation of Leo, the lion, is making its appearance. The part shown on the map represents his head and shoulders, for his hind quarters are still below the horizon. In the part depicted, however, we find the brightest star in the group, called Regulus, although its low altitude causes a dimming of its light.

January's other planets all appear after midnight. First to rise is Jupiter, which comes above the eastern horizon, in the constellation of Virgo, the virgin, about 1:30 a.m. Although inferior to Venus in brightness, it is about as bright as Sirius, which makes it quite conspicuous. At approximately 5:00 a.m., Mars rises, in Scorpius, the scorpion, just to the left of the star Antares. At present Mars is rather faint—about the brilliance of a second magnitude star such as Polaris, the pole star. A little later Saturn rises, about twice as bright as Mars.

Mercury Rises Early

On Jan. 15 Mercury, which will then be in Sagittarius, the archer, will be farthest west of the sun, and will rise before sunrise. Thus, for a few days around this date it may be possible to get a glimpse of it near the southeastern horizon as dawn is breaking. It will then be nearly twice as bright as Saturn but hard to see because of the brightness of the sky.

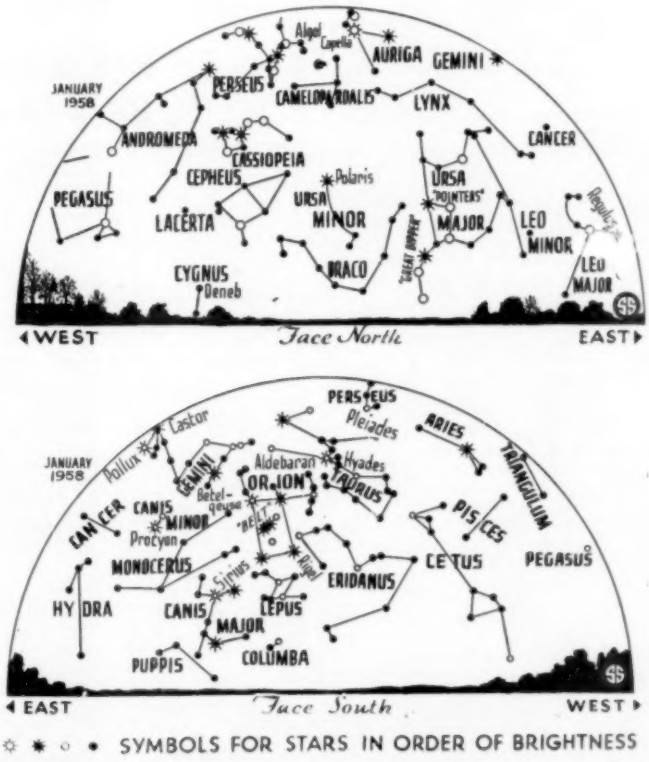
While some astronomical events can be predicted, others happen unexpectedly. For example, 1957 brought two naked-eye comets, the first in a number of years, which no one had foreseen in January. Several periodic comets are scheduled to return in 1958, but none will be conspicuous to the naked eye. However, among the predictable events there are several interesting items on the 1958 program of the skies.

There will be two eclipses of the sun, neither visible in the United States and Canada. The first of these will occur on April 19, which will be an annular eclipse. This is one that occurs when the moon is farther away from us than usual, so that its apparent size is less than that of the sun. Thus, even though the moon will pass directly in front of the sun, for some locations on the earth, it will not completely cover it. Around the dark disc of the moon there will appear a complete ring, or "annulus," of the solar disc.

The effect will be visible along a path beginning in the Indian Ocean southeast of India. From there it passes over Siam and Viet Nam, Formosa, the East China Sea, the Ryukyus, south of Japan, and ends in the Pacific Ocean. Over nearly all of Asia, except the northwestern part, Indonesia, the Pacific Ocean and Alaska, a partial eclipse of the sun will be seen.

Total Eclipse of the Sun

The second eclipse of the sun will occur on Columbus Day, Oct. 12. This is total, with the moon completely covering the sun, for more than five minutes at the most favorable location. The path of totality,



along which the total phase will appear, will be a hundred miles wide, starting as the sun rises at a point on the equator north of the Solomon Islands, in the southwestern Pacific Ocean. This path, which is traced out by the moon's shadow as it races eastward, passes over some small islands in the Union and Danger groups, which are north and northeast of Samoa. Finally the path reaches the coast of Chile, near Valparaiso, and it ends as the sun is setting, at a point in Argentina, near the city of Cordoba.

Total eclipses of the sun offer astronomers a chance to make many observations which cannot be made at other times, or at least not as well. Thus, it is likely that many of them will undertake expeditions to the Pacific islands where this eclipse will be visible.

There will also be an eclipse of the moon, which occurs when the earth comes between the sun and moon, on May 3. This, however, will be only partial, with a maximum of about 15% of the moon's diameter getting into the earth's shadow. This will be visible in the western parts of the United States and Canada, over most of the Pacific Ocean, eastern Asia, Australia and Antarctica.

In 1958 Mars will again come close to the earth, not as near as it did on Sept. 7, 1956, when it was only 35,120,000 miles away, but much closer than it will come again for several years. This will be on Nov. 8, with a distance of a little more than 45,310,000 miles.

On Jan. 1 Mars is far out beyond the sun, 212,000,000 miles from earth, but until November it will be moving in. On April 1, it will be at a distance of 154,000,000 miles; July 1, 101,000,000 miles; Oct. 1, 55,000,000 miles and Nov. 1, 45,800,000 miles. At the time of its closest approach it will be of magnitude minus 1.9, or about 25 times as bright as it is now. Thus, it will be interesting to watch it during the year, as it gradually increases in brilliance.

By next autumn, many astronomers will be watching Mars, hoping to solve some of the many problems presented by this red planet.

Celestial Time Table for January

JAN.	EST	
3	9:00 a.m.	Earth nearest sun for year, distance 91,342,000 miles.
5	3:09 p.m.	Full moon.
8	7:00 p.m.	Moon nearest, distance 227,600 miles.
10	12:48 a.m.	Algol (variable star in Perseus) at minimum brightness.
12	9:01 a.m.	Moon in last quarter.
	9:38 p.m.	Algol at minimum.
13	12:12 a.m.	Moon passes Jupiter.
15	6:27 p.m.	Algol at minimum.
	11:00 p.m.	Mercury farthest east of sun, visible for a few days low in east before sunrise.
19	5:08 p.m.	New moon.
23	5:00 a.m.	Mars passes Saturn.
24	7:00 p.m.	Moon farthest, distance 251,800 miles.
27	9:16 p.m.	Moon in first quarter.
28	3:00 p.m.	Venus between earth and sun (inferior conjunction).

Subtract one hour for CST, two hours for MST, and three for PST.

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AIDS TO MATERIA MEDICA AND THERAPEUTICS—J. W. Hadgraft—*Baillière, Tindall and Cox (Williams and Wilkins)*, 5th ed., 259 p., $3.25. Indicating to medical students the way drugs are formulated and alternative preparations available.

AIRCRAFT ANNUAL 1958—John W. R. Taylor, Ed.—*Philosophical Lib.*, 96 p., illus., $6. Telling what is new overhead.

ANTHROPOLOGICAL PAPERS, NUMBERS 49-56—Jesse D. Jennings, Gordon R. Willey and Marshall T. Newman and others—*Govt. Printing Office*, Bureau of American Ethnology Bulletin 164, 355 p., illus., paper, $2.75.

BASIC ELECTRICITY—Rufus P. Turner—*Rinehart*, 396 p., illus., $6.50. Text for beginning students.

BODY WATER IN MAN: The Acquisition and Maintenance of the Body Fluids—Maurice B. Strauss—*Little*, 286 p., illus., $7. Survey of the physiologic mechanisms by which the volume and osmotic composition of the body fluids in man are maintained in dynamic equilibrium.

THE CREATION OF THE UNIVERSE—George Gamow—*New American Library*, 144 p., illus., paper, 50 c. The third book of the author's trilogy on the sun, the earth and the universe as a whole.

ENGINEERING FLUID MECHANICS—Charles Jaeger, translated from the German by P. O. Wolf—*St. Martins*, 529 p., illus., $11.50. Covering the methods of analysis and calculation required for the design of water-power schemes.

GOOD NEWS FOR STROKE VICTIMS—Elizabeth Ogg—*Public Affairs Committee*, Public Affairs Pamphlet No. 259, 28 p., illus., paper, 25 c. The chances for overcoming the effects of a stroke are much greater today than they were even four or five years ago.

HELPING YOUR CHILD TO READ BETTER—Robert M. Goldenson—*Crowell*, 312 p., illus., $3.95. What the parent can do to help his child to read and, before school age, to get him ready to learn.

HOW TO DO AN EXPERIMENT—Philip Goldstein, Paul F. Brandwein, Gen. Ed.—*Harcourt*, 192 p., illus., $2.60. Telling the junior scientist about scientific methods and giving him ideas for science projects and exhibits for Science Fairs.

AN INTRODUCTION TO AUTOMATIC COMPUTERS—Ned Chapin—*Van Nostrand*, 525 p., illus. $8.75. So that people in business can understand the uses and limitations of computers.

PAPERS PRESENTED AT THE FALL 1957 RTCA ASSEMBLY MEETING—*Radio Technical Commission for Aeronautics*, illus., paper, 60 c. Discussing, among other matters, the guided missile and satellite programs and air traffic control.

PHYSICS AND CHEMISTRY OF THE EARTH: 2—L. H. Ahrens, Frank Press, Kalervo Rankama, and S. K. Runcorn, Eds.—*Pergamon*, 259 p., illus., $10. One of an annual series of up-to-date surveys of progress in the field.

QUANTITATIVE PLANT ECOLOGY—P. Greig-Smith—*Academic*, 198 p., illus., $6. Plant ecology is at present in a transitional stage into the quantitative outlook.

SMITHSONIAN INSTITUTION ANNUAL REPORT OF THE BOARD OF REGENTS—Leonard Carmichael, Secretary—*Govt. Printing Office*, 580 p., illus., $4.50. Containing, as usual, a collection of articles of timely scientific interest.

STRENGTH OF MATERIALS—F. R. Shanley—*McGraw-Hill*, 783 p., illus., $8.50. A first text in college courses in engineering and science.

THE WARBLERS OF AMERICA: A Popular Account of the Wood Warblers as They Occur in the Western Hemisphere—Ludlow Griscom, Alexander Sprunt, Jr. and Others, Eds.—*Devin-Adair*, 356 p., illus. with drawings and paintings by John Henry Dick, $15.00. This beautiful book is intended for the beginner as well as for the serious bird student.

MEDICINE

Booster Shots Might Prevent Flu Epidemics

➤ FUTURE INFLUENZA epidemics, like the current Asian one, may be eliminated by building up a broad immunity to all known types of influenza with properly spaced vaccinations of the right vaccine.

This is indicated in research by Drs. Fred M. Davenport and A. V. Hennessy of the University of Michigan School of Public Health, Ann Arbor.

Their studies show resistance to influenza is controlled by the existence of a broadly reacting antibody giving protection to an individual regardless of minor changes in the prevalent strain of flu virus.

It is this broad immunity that can be built up by an initial vaccination, plus booster shots at set intervals to increase antibody production.

Vaccinations greatly reinforce production of antibodies to strains of the virus previously encountered by a person, but they have a much smaller stimulating effect when antibodies to a new strain must be built up. Thus, if boosters are given after the first vaccination, they will greatly increase antibody production.

Repeated vaccinations with appropriate viruses would be expected to yield a longer lasting immunity that would not be threatened by minor, although seemingly dramatic, changes in the "virus of the year," the scientists report in the *Journal of Experimental Medicine* (Dec.).

Science News Letter, December 28, 1957

CHEMISTRY

Daylight Makes Changes In Cigarette Smoke

➤ CIGARETTE smoke which has been exposed to daylight is not the same as the smoke inhaled by a smoker, a fact that may be important in some cancer-smoking experiments, Dr. Hilda Johnston, Royal Beatson Memorial Hospital, Glasgow, Scotland, reports in *Nature* (Dec. 14).

When fresh smoke is dissolved in a benzene solution it is fluorescent, but after this solution is exposed to light, it begins to lose this characteristic fluorescence.

A decrease in fluorescence indicates one obvious difference between the original smoke inhaled by a smoker, which contains unchanged products, and any solution of the smoke products, which has been exposed to light and then used for chemical or biological tests.

The products in the smoke which undergo this light change are not known, although they come from the actual burning process and are not something found even in unburned tobacco.

Many vegetable products heated to the same temperature give similar results when benzene solutions of their smoke are exposed to light.

However, tobacco is the only vegetable product commonly smoked and inhaled into the lungs, so its decrease in fluorescence might still be important.

The existence of light-sensitive elements in tobacco smoke strengthens the theory that free radicals are formed when organic material is burned like tobacco.

Free radicals have been suspected of being cancer-producing by some researchers, although no free radicals have actually been found in cigarette smoke.

Science News Letter, December 28, 1957

GEOPHYSICS

Byrd's Abandoned Snow Cruiser Found

➤ ADMIRAL Richard E. Byrd's 1939-41 Antarctic expedition snow cruiser, which cost $125,000, has been found beneath 14 feet of snow at Little America.

Byrd intended to use the 33-ton "snowbird" on wheels in his 1941 expedition.

Inside the cabin of the snow cruiser were found souvenir envelopes prematurely printed "The snow cruiser reaches the South Pole."

Soft snow bogged the cruiser's 10-foot diameter balloon tires and it got only a few miles from where it was unloaded from the expedition ship North Star.

It did not have enough power to dig itself out of its own tracks.

The vehicle was intended to conquer the Antarctic hinterland and carried a light aircraft on its roof for reconnaissance.

The cruiser is unlikely to be salvaged this Antarctic summer as it would require a bulldozer to dig down about 30 feet and cut a ramp 100 feet long for it to be dragged out.

Science News Letter, December 28, 1957

METEOROLOGY

Storm Warnings Sent By Conelrad

➤ UNDER a new storm warning plan, Conelrad alert receivers that have been set up to warn of possible enemy attack will now be used to disseminate emergency weather bulletins.

Broadcast and public safety services, as well as other services, have the alerting capability, and the plan means that ordinary but modified receivers can be used to give authentic information about serious weather conditions.

Science News Letter, December 28, 1957

PHYSICS

Impurities Need Removing

➤ A NEW PROBLEM in harnessing the hydrogen bomb's fiery reactions for peaceful purposes was suggested to the American Physical Society meeting in Stanford, Calif., by Dr. Richard F. Post of the University of California's Radiation Laboratory in Livermore.

The problem is impurities in the experimental gases, usually hydrogen, which scientists are now using in experiments aimed at taming the energy of fusion for controlled power.

The impurities in hydrogen gas and the difficulties they cause can be likened to the impurities in uranium impeding the progress toward controlled atomic fission in the early experimental work in that field. Before the first atomic pile could be built, indeed before it could even be considered a possibility, scientists had to make extensive measurements on uranium of a purity then undreamed of.

Dr. Post reported only a small percentage of impurities in the hydrogen gas with which scientists are now experimenting in their attempts to control fusion would result in a great increase in unwanted radiation at the high temperatures necessary.

What scientists want to obtain from the thermonuclear process is extra neutrons, which will be formed only at temperatures of several million degrees. Reports that these extra neutrons have been achieved by the British recently and by the Russians about a year ago could be true, yet the neutrons could be of a "bad kind, not a good kind," Dr. Post said. The bad kind would be unwanted, interfering with the desired process.

At temperatures required to attain nuclear fusion, in the neighborhood of a hundred million degrees centigrade, hydrogen turns into an electrically charged gas called a "plasma." Dr. Post reported on a radiation process in a high temperature plasma and how the technical problems encountered in experimental work in this field influence the course of future research.

The side effects caused by impurities in hydrogen may be important in future experiments on harnessing extremely high temperature reactions, he said.

Science News Letter, December 28, 1957

Questions

ASTRONOMY—What is meant by inferior conjunction? p. 407.

MEDICINE—What relation has been found between injury and coronary disease in rats? p. 411.

PHYSICS—How big in circumference is the alternating gradient synchrotron under construction at the Brookhaven National Laboratory? p. 403.

TECHNOLOGY—How can the device for reading handwritten numbers be adjusted to identify handwritten letters? p. 405.

Photographs: Cover, Stanford Research Institute; p. 403, United Press Telephoto; p. 405, Bell Telephone Laboratories, Inc.; p. 412, Eastman Chemical Products, Inc.

BIOLOGY

"Internal Clock" Times Squirrel's Hibernation

➤ SQUIRRELS seem to have some kind of "internal seasonal clock" that sets them hibernating only at the right time of year, two Canadian scientists report in *Nature* (Dec. 14).

For nearly two years Eric T. Pengelley and Kenneth C. Fisher of the department of zoology, University of Toronto, kept a squirrel under controlled conditions of temperature, light and availability of food. Kept in a room with a mean temperature of about 35 degrees Fahrenheit, with unlimited food and water, ample bedding and 12 hours of artificial daylight, the squirrel persisted in hibernating during October through May. Eight other golden mantled ground squirrels were tested for shorter periods under varying conditions and all showed the same tendency to hibernate only during the autumn-winter season.

A large drop in weight, caused by denying food during June through September, forced hibernation. However, the scientists report, the animal cannot survive this for long. Access to an exercise wheel in the autumn tends to delay hibernation, but the animal does not hibernate for a longer time to make up for the lost "sleep."

Variations in noise level, barometric pressure and the water content of the air are discounted by the scientists as factors that trigger a squirrel's hibernation.

Instead, they report, it seems necessary to conclude that the species possesses some form of internal seasonal clock which determines periods of hibernation and activity.

Science News Letter, December 28, 1957

MEDICINE

Coronary Disease May Be From Early Injury

➤ THE CLOSING down of arteries in old age may be due more to changes within the arterial walls themselves, than to the amount of various fats and minerals circulating in the blood.

This is reported by Drs. Theodore Gillman and Michael Hathorn of the University of Natal, Durban, South Africa, in the *Journal of the Mount Sinai Hospital* (Nov-Dec).

Experimental findings with rats indicate that when coronary sclerosis, closing of the arteries that feed the heart, happens in a man 40 or 50 years old, it may be the result of an injury to the vessels that occurred years before and is only now showing up.

The aorta, the main artery from the heart, may be particularly prone to damage between the ages of 12 and 20 because it is growing rapidly to keep up with the great increase in trunk length during this growth period. During this time, something may happen to the normal metabolism that helps create the elastic membranes in the arteries and over the years scar tissue may begin to form.

The scars are similar to those found after severe skin injuries heal. The cellular changes that create them occur in the same sequence as they do in skin, but they occur much more slowly in arteries.

A single, severe artery injury to rats did not show up as true scar formation until months later, the scientists report. When the lifespan of this animal is adjusted to that of man's, one could expect a period of years to pass between the injury and the appearance of the scar tissue in humans.

Science News Letter, December 28, 1957

Do You Know?

After treatment with large doses of *streptomycin*, mice developed illness from less than 10 test bacteria, as compared with 10,000 to 100,000 bacteria required for infection of normal mice.

Raising world consumption of *milk* products from the present estimated 200 pounds per capita to the 400 pounds recommended by nutritionists, would wipe out current world surpluses.

Some 22,000 acres of forest infested with jack-pine *budworms* were sprayed by airplane during a week in late June, 1956; 95% of the budworms were killed.

A reduction of about 50% in dental problems in one U. S. city during a ten-year test of water *fluoridation* has been reported.

● RADIO

Saturday, Jan. 4, 1958 1:30-1:45 p.m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Dr. E. Harold Hinman, School of Medicine, University of Puerto Rico, San Juan, P. R., will discuss "Medicine in Puerto Rico."

New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 915. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

RUBBER SPONGE MOP, self-wringing, is made of aluminum. Weighing less than two pounds, the mop has a two-piece sectional metal handle for storing convenience. The sponge can be used to scrub, wax, dust, wash or shampoo walls, floors and rugs. It is eight and one-half inches wide.

Science News Letter, December 28, 1957

SCREW-HOLDING DRIVER for electric and electronic assembly work and maintenance holds a screw in place until the threads take hold. Designed for work in hard-to-get-at places, it works when pressure against the screw expands twin bits, automatically tightening the grip within the screw slot.

Science News Letter, December 28, 1957

QUICK-DRYING PAINT promises fast redecorating of business offices. It is a tough paint based on a vinyl acetate resin latex. Described as relatively odorless and drying overnight, the paint can be applied by brush, roller or spray. It resists both acids and alkalies, and is washable.

Science News Letter, December 28, 1957

HOME OILER is a hydraulic-type device that holds up to four ounces of lubricating oil. Made of a butyrate plastic, the oiler, shown in the photograph, can be

aimed and "fired" at hard-to-get-at parts. The oiler's base unscrews to permit filling. It is available in red, yellow or green.

Science News Letter, December 28, 1957

CHURCH CUSHIONING is designed for use on straight or radius pews. Resiliency comes from a one and one-quarter inch slab of a plastic foam. Permanently fastened, the cushioning is non-slipping and fire resistant. It is also resistant to moisture, mildew and moths.

Science News Letter, December 28, 1957

AUTOMATIC TRENCHING MACHINE helps in the laying of plastic pipe and cable. The wheel-mounted machine cuts through hard ground forming a trench two and one-quarter inches wide. Three models are available that trench to depths of 12, 18 or 24 inches. It can be operated at speeds up to three feet per minute.

Science News Letter, December 28, 1957

COMPOUND ANGLE CALCULATOR for the do-it-yourself woodshop enthusiast is said to save time, timber and temper. The number of sides is set on a revolving scale opposite the work angle. The reading gives the exact miter gauge setting and saw angle.

Science News Letter, December 28, 1957

DRILL ACCESSORIES KIT for electric power drills is housed in a tool-box with a tray that measures 18 by 6 by 8 inches. The kit includes a paint mixer, wire brush, grinding wheel, buffing wheel, nine twist drills, 15 sandpaper discs, a polishing bonnet, rubber pad, speed stand and adapter set.

Science News Letter, December 28, 1957

Nature Ramblings

By HORACE LOFTIN

➤ WINTER has surrounded us now, and we are her prisoners. Her chain is long. One day we may enjoy the brief freedom of clear, crisp, invigorating days. But then she draws us back inside with dreary, gray days and damp, penetrating winds. Then, most of all, do we miss the freedom of early summer.

If there is one single thing that symbolizes summer freedom and summer pleasure, it is the sharp, sweet call of the bobwhite or quail. If you can pull from your memory that "ah-bob-white," the dreariness fades from the winter day, and you see a green field shimmering in the June sunshine.

The bobwhite's song that won him his name is a love call, and certainly a beautiful one.

It is the call of the cock seeking a mate. As the summer wears on and the call persists, you may guess that it becomes a call

Summertime Memory

of unrequited love. Family men among the bobwhites rarely if ever sing the "ah-bob-white!"

Studies have shown there are about 110 to 115 cocks for every 100 hen bobwhites. Thus, a considerable number of males remain bachelors throughout the breeding season. It is these unattached cocks who maintain the summer-long music of their tribe.

In an experiment, a bachelor bobwhite was watched from four a.m. to seven-thirty p.m. one summer's day. During that time he gave out 1,430 typical "bobwhite" calls. There were only 228 minutes of this day in which the lonesome bobwhite did not give one or more calls. The greatest number of "bobwhites" he sang in one single minute was eight!

When these singing, single birds are captured and placed with an unmated female, their singing stops and they take up the role of husband and expectant father. In rare cases, when for some reason the bachelor's chosen mate does not suit him, he is apt to continue his singing while he shirks domestic duty.

Bobwhite breeders take advantage of bachelor bobwhites' singing advertisement of availability by capturing them to act as fathers (and mothers) to bobwhite chicks that were artificially hatched. They take to their duty eagerly, giving up freedom and song for foster parenthood!

Science News Letter, December 28, 1957